Investigation of a hydrogen plasma waveguide

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A hydrogen plasma waveguide for high-intensity laser pulses is described. The guiding channel is formed by a small-scale discharge in a hydrogen-filled capillary. The measured lifetiae of the capillary is inf43ifeti7.Dec04.3f26.236 Tf 86.236 160T

experiences a fully ionized plasma, modulational instabilities due to bound electrons should not be significant. As such the waveguide presented here is an almost ideal plasma waveguide, since any additional losses or instabilities are inherent to plasmas of this density.

The waveguide we have described offers a number of advantages over other techniques. The small-scale discharge circuit is simple and compact. We have operated our waveguide with capillaries up to 60 mm. Longer capillaries will require voltages of greater than 25 kV in order to break down